



TCP Remote Protocol, version 1.1

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TiVo TCP Control Protocol

Overview

The TiVo TCP Control Protocol is an ASCII-based command protocol for remote control of a TiVo DVR over a TCP network connection. The commands allow control of channel changes and user interface navigation, and allow the client to send simulated remote control button presses to the DVR.

For a complete list of commands, see “Commands” on page 3.

Before using the TiVo TCP Control Protocol, read this document completely, paying special attention to the design guidelines. You should already be familiar with the mechanics of opening and using TCP connections before using the protocol.

Important

Your TiVo DVR can be controlled by networked devices (such as a Crestron home control system). Beginning with version 9.4 of the TiVo software, this feature is turned off by default to ensure the security of your home network.

To enable networked remote control on your TiVo DVR:

1. Go to TiVo Central > Messages & Settings > Settings > Remote, CableCARD & Devices > Network Remote Control.
2. Choose Enabled.
3. Press Select.

Using the TiVo TCP Control Protocol

To use the TiVo TCP Control Protocol, open a TCP socket on port 31339 and send properly formatted command packets. Each command packet consists of a single line of uppercase text, terminated by a carriage return.

Command Syntax

A command packet is a command and its parameters, separated by single spaces.

Example:

```
COMMAND {PARAMETER} {PARAMETER}...
```

Design Guidelines

In order to provide the best possible user experience, please follow these guidelines:

- Be sure to implement all the remote control buttons or features supported by any TiVo DVRs your device will control.
- Make sure that any command fails gracefully when appropriate. For example, if a user attempts to send text when no text fields are displayed on the TV, there should be no unpleasant consequences.
- Keep the controls grouped in the five clusters that users expect:
 - Navigation
 - Control
 - TrickPlay
 - Numeric
 - Alphanumeric/QWERTY

For more information about which keys fall into each cluster, see “Appendix A - KEYBOARD and IRCODE” on page 11.

Commands

The protocol includes the following commands:

- Commands for sending a code corresponding to a button on the remote control or keyboard:
 - IRCODE
 - KEYBOARD
- Commands for tuning to a particular channel
 - SETCH
 - FORCECH
- A command for teleporting (navigating directly) to one of certain user interface screens
 - TELEPORT

The following sections provide detailed information about each command.

FORCECH

Tunes the DVR to the specified channel, canceling a recording in progress if necessary. The DVR must be in Live TV in order for the FORCECH command to succeed.

Format

FORCECH channel

FORCECH channel sub-channel

Parameters

channel

A number from 1 to the maximum channel number in the channel list (depends on programming lineup). Leading zeros are not required for padding, but are allowed.

sub-channel

A number from 1 to the maximum channel number in the channel list (depends on programming lineup). Leading zeros are not required for padding, but are allowed.

Examples

FORCECH 2

Sets channel 2.

FORCECH 002

Sets channel 2.

FORCECH 2 1

Sets channel 2-1; most likely, primary channel 2 with digital ATSC sub-channel 1.

Response Format

The FORCECH command returns a response to the client to indicate the success or failure of the command.

Success Responses

CH_STATUS channel reason

CH_STATUS channel sub-channel reason

Returned Values

channel

Fixed 4-digit primary channel number.

sub-channel

Fixed 4-digit sub channel number.

reason

One of the following reason codes:

- REMOTE—An external client made the channel change request.

- `LOCAL`—The remote was used to change channels.
- `RECORDING`—The channel changed in response to an internal process such as the DVR changing channels to begin a recording.

After a successful channel change, all open clients receive the `CH_STATUS` message.

Failure responses

`CH_FAILED` reason

Returned Values

reason

One of the following reason codes:

- `NO_LIVE` —The DVR was not in Live TV at the time the command was issued.
- `MISSING_CHANNEL`—Missing at least one parameter for channel number.
- `MALFORMED_CHANNEL`—Channel was not a valid integer.
- `INVALID_CHANNEL`—Channel was not found in the TCD channel lineup.

After a failure, only the client that issued the `FORCECH` command receives the `CH_FAILED` message.

Examples

`CH_FAILED` `NO_LIVE`

The `FORCECH` command failed because the UI was not in Live TV mode at the time the command was issued.

`CH_STATUS` `002` `01` `LOCAL`

The `FORCECH` command succeeded; the DVR is now tuned to channel 2-1.

KEYBOARD

Sends a code corresponding to a key on an alphanumeric keyboard. The DVR processes the code as input from a standard alphanumeric keyboard.

Not all key presses are supported by all applications, and depending on the state of the user interface, the key press might be ignored or disallowed. In these cases the KEYBOARD command might result in unexpected behavior.

The client can send as many KEYBOARD requests as desired. If requests arrive faster than the DVR can process them, the DVR queues the requests and processes them in the order they arrived.

Format

KEYBOARD code

Parameters

code

The name of a key that corresponds to a keyboard key. A list of supported keys can be found in Appendix A.

To produce capital letters or symbols an application must send the proper sequence of keystrokes which will produce the desired character using a standard US English keyboard. The shift modifier keys are applied to the immediately following KEYBOARD command.

Example

KEYBOARD A

KEYBOARD LSHIFT

KEYBOARD A

Produce the lower case followed by the upper case A character in applications that support mixed case.

KEYBOARD LSHIFT

KEYBOARD BACKQUOTE

Produce the ~ (tilde) character in applications that support symbols

IRCODE

Sends a code corresponding to a button on the remote control. The DVR processes the code as a button press. The DVR is guaranteed to process the code. Depending on the state of the user interface, the key might be unused or disallowed; in such cases, the IRCODE command might have an unexpected effect.

The client can send as many IRCODE requests as desired. If requests arrive faster than the DVR can process them, the DVR queues the requests and processes them in the order they arrived.

Format

```
IRCODE code
```

Parameters

code

The name of an IR code that corresponds to a button on the remote control. For a list of IR code names, see “Appendix A - KEYBOARD and IRCODE” on page 11.

Example

```
IRCODE SELECT
```

Sends the IR code corresponding to the SELECT button on the remote control.

SETCH

Tunes the DVR to the specified channel, unless a recording is in progress. The DVR must be in Live TV mode in order for the SETCH command to succeed.

Format

SETCH channel

SETCH channel sub-channel

Parameters

channel

A number from 1 to the maximum channel number in the channel list (depends on programming lineup). Leading zeros are not required for padding, but are allowed.

sub-channel

A number from 1 to the maximum channel number in the channel list (depends on programming lineup). Leading zeros are not required for padding, but are allowed.

Examples

SETCH 2

Sets channel 2.

SETCH 002

Sets channel 2.

SETCH 2 1

Sets channel 2-1; most likely, primary channel 2 with digital ATSC sub-channel 1.

Responses

The SETCH command returns a response to the client to indicate the success or failure of the command.

Success Responses

CH_STATUS channel reason

CH_STATUS channel sub-channel reason

Returned Values

channel

Fixed 4-digit primary channel number.

sub-channel

Fixed 4-digit sub channel number.

reason

One of the following reason codes:

- REMOTE—An external client made the channel change request.
- LOCAL—The remote was used to change channels.

- **RECORDING**—The channel changed in response to an internal process such as the DVR changing channels to begin a recording.

After a successful channel change, all open clients receive the **CH_STATUS** message.

Failure responses

CH_FAILED reason

Returned Values

reason

One of the following reason codes:

- **NO_LIVE** —The DVR was not in Live TV at the time the command was issued.
- **RECORDING** —A recording was in progress.
- **MISSING_CHANNEL**—Missing at least one parameter for channel number.
- **MALFORMED_CHANNEL**—Channel was not a valid integer.
- **INVALID_CHANNEL**—Channel was not found in the TCD channel lineup.

After a failure, only the client that issued the **SETCH** command receives the **CH_FAILED** message.

Examples

CH_FAILED NO_LIVE

The **SETCH** command failed because the UI was not in Live TV mode at the time the command was issued.

CH_STATUS 002 01 LOCAL

The **SETCH** command succeeded; the DVR is now tuned to channel 2-1.

TELEPORT

Forces the DVR to navigate to one of several special screens:

- TiVo Central—the top-level menu
- Live TV—live TV viewing
- Guide—the program guide
- Now Playing—the list of recordings

The TELEPORT command is guaranteed to succeed unless the DVR is in the process of Guided Setup. On success, TELEPORT does not return any response except when used with LIVETV.

Format

TELEPORT screen

Parameter

screen

The screen to which the DVR should navigate, specified by one of the following strings:

- TIVO
- LIVETV
- GUIDE
- NOWPLAYING

Example

TELEPORT LIVETV

Responses

Success Responses

LIVETV_READY

TELEPORT only returns a success response when issued with LIVETV. If the command succeeds, TELEPORT returns LIVETV_READY to indicate that the DVR is now in live TV mode. Any client wishing to set a channel must wait for LIVETV_READY before issuing a SETCH or FORCECH command.

Failure Responses

MISSING_TELEPORT_NAME

Indicates that the TELEPORT command was issued without the required screen parameter.

Appendix A - KEYBOARD and IRCODE

KEYBOARD and IRCODE

The following tables show buttons supported by both KEYBOARD and IRCODE commands.

Navigation Buttons

These buttons allow the user to navigate screens in the TiVo user interface.

UP DOWN LEFT RIGHT	These buttons move the highlight around on TiVo user interface screens. The LEFT and RIGHT buttons also navigate forward and backward between screens.
SELECT	Selects the highlighted option.
TIVO	Teleports to TiVo Central.
LIVETV	Teleports to Live TV mode.
GUIDE	Displays the program guide.
INFO	Displays additional information.
EXIT	Exits current menu.

Control Buttons

These buttons control the channel, volume, and TV display, and allow the user to express preferences.

THUMBSUP THUMBSDOWN	Rate a program.
CHANNELUP CHANNELDOWN	Change the channel.
MUTE VOLUMEDOWN VOLUMEUP	Change the audio volume.
TVINPUT	Select the TV input source.

VIDEO_MODE_FIXED_480i VIDEO_MODE_FIXED_480p VIDEO_MODE_FIXED_720p VIDEO_MODE_FIXED_1080i VIDEO_MODE_HYBRID VIDEO_MODE_HYBRID_720p VIDEO_MODE_HYBRID_1080i VIDEO_MODE_NATIVE	Select the video mode.
CC_ON CC_OFF	Turn closed captioning on or off.
OPTIONS	Control display options for the program guide, the Now Playing List, and so on.
ASPECT_CORRECTION_FULL ASPECT_CORRECTION_PANEL ASPECT_CORRECTION_ZOOM ASPECT_CORRECTION_WIDE_ZOOM	Select the aspect mode.

TrickPlay Buttons

These buttons control the playback of video content.

PLAY	Play the video at normal speed.
FORWARD REVERSE	Cue and review quickly through the video.
PAUSE	Pause the video.
SLOW	Play the video in slow motion.
REPLAY	Replay the last 8 seconds of video.
ADVANCE	When playing video, jump to the beginning or end; when cueing or reviewing, jump to the next tick-mark on the TrickPlay bar.
RECORD	Record the current program.

Numeric Buttons

These buttons allow the user to enter a channel or other number.

NUM0	The numbers 0 through 9.
NUM1	
NUM2	
NUM3	
NUM4	
NUM5	
NUM6	
NUM7	
NUM8	
NUM9	
ENTER	Enter the number.
CLEAR	Clear the number.

Shortcut Buttons

These buttons allow the user to activate shortcuts throughout the user interface.

ACTION_A	
ACTION_B	
ACTION_C	
ACTION_D	

KEYBOARD ONLY

The following tables show those buttons supported by the KEYBOARD command only.

Alphabet Buttons

The buttons representing the alphabet (A-Z) are supported.

Special Character Buttons

These buttons allow the user to enter a special character..

MINUS	-
EQUALS	=
LBRACKET	[
RBRACKET]
BACKSLASH	\
SEMICOLON	;
QUOTE	“
COMMA	,
PERIOD	.
SLASH	/
BACKQUOTE	“
SPACE	

Navigation Buttons

These buttons allow the user to move the cursor..

KBDUP	Moves cursor up.
KBDDOWN	Moves cursor down.
KBDLEFT	Moves cursor left.
KBDRIGHT	Moves cursor right.
PAGEUP	Moves cursor up a page.
PAGEDOWN	Moves cursor down a page.
HOME	Moves cursor to the beginning.
END	Moves cursor to the end.

Edit Buttons

These buttons help edit.

CAPS	Capitalizes all subsequent keystrokes. If already in CAPS mode, turns off CAPS mode.
LSHIFT	Capitalizes the next character.
RSHIFT	Capitalizes the next character.
INSERT	Inserts subsequent characters at the cursor.
BACKSPACE	Deletes the preceding character, and moves the cursor backwards.
DELETE	Deletes the next character.
KBDENTER	Enter key.

Control Buttons

STOP	Stops play.
VIDEO_ON_DEMAND	Activates VOD menu.

